

REMARKS

Favorable reconsideration is respectfully requested in view of the foregoing amendments and following remarks.

Claim 7 and the specification on page 4 have been amended as suggested by the Examiner to clarify the pH range.

Accordingly, the objection to the disclosure and the rejection of claim 7 under 35 USC 112, second paragraph, is deemed to be overcome.

Claims 7-12 are rejected under 35 USC 103 as unpatentable over JP 2002-241856 in view of Brix. Claims 7-12 are further rejected under 35 USC 103 as unpatentable over JP 357140838 in view of Brix.

These grounds of rejection are respectfully traversed.

(1) Feature of the present invention

A substantially complete removal of Mn contained in a cobalt sulfate solution is achieved by (1) adding NaOCl as an oxidative agent to the solution at a pH of 2.5 to 6 to attain an oxidation-reduction potential (ORP) in the range of 1100 to 1300 mV relative to the standard hydrogen electrode(SHE), thereby oxidizing Mn to form a precipitate of Mn, and by (2) separating the precipitate from the solution. It is essential for the present invention to use NaOCl to obtain an ORP of 1100 to 1300 mV (SHE).

(2) Japanese Patent No. 2002-241856 (hereinafter D1) discloses:

(a) Ni(OH)₃ and/or Co(OH)₃ are added as an oxidative agent to a Mn+NiSO₄+CoSO₄ solution at a pH of 3 or lower,

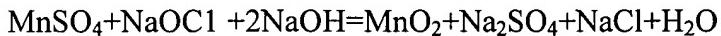
(b) to adjust the ORP (to an Ag-AgCl electrode) in the range of 1000-1200 mV (which is equivalent to 1220-1420 mV relative to an SHE electrode) to precipitate MnO₂.

(3) Japanese Patent No. 357140838A (hereinafter D2) discloses:

(a) Ni(OH)₃ and/or Co(OH)₃ are added as an oxidative agent to a Mn+NiSO₄+CoSO₄ solution at a pH of 0.8-1.8,

(b) to attain an ORP (to a saturated calomel electrode) in the range of 800-1100 mV (which is equivalent to 1040-1340 mV relative to an SHE electrode) to precipitate MnO₂.

- (4) Brix (U.S. Patent No. 2,822,243) discloses:
- (a) to a MnSO₄ solution at a pH of 5.4,
 - (b) a mixture of NaOCl and NaOH is added to precipitate Mn at a pH of 7, according to the following chemical reaction (cf. column 3, lines 1-19):



(5) The Examiner takes the position that the present invention would be obvious over D1 or D2 in view of Brix, on the basis that it would have been easily achieved if the oxidative agent of D1 or D2 had been replaced by the mixture of NaOCl and NaOH of Brix.

However, the prior art fails to teach or suggest the oxidative effect of the mixture of NaOCl and NaOH of Brix on a cobalt sulfate solution containing Mn. The solution of Brix is not a cobalt sulfate solution.

In fact, as is clear from the Rule 132 Declaration of Dr. Naoichi Yamamoto enclosed herewith, the mixture of NaOCl and NaOH does neither attain the ORP of the required range, nor does it work as an oxidative agent for completely oxidizing Mn contained in the cobalt sulfate solution.

Further, it is demonstrated that the oxidant of Brix (the mixture of NaOCl and NaOH having a molar ratio of 1:2) decreases the ORP and cannot oxidize any Mn under the same condition in which NaOCl alone achieves the required ORP and the desired degree of Mn oxidation.

Therefore, it is clear that the combined method of D1 or D2 and Brix cannot achieve the claimed method.

Accordingly, it is respectfully submitted that the claimed method for removing Mn from a cobalt sulfate solution could not have been obvious to a person of ordinary skill in the art, even from the combined teachings of D1 or D2 in view of Brix.

Favorable reconsideration and allowance is solicited.

Respectfully submitted,

Juraj BABJAK et al.

By: Warren Cheek Jr.
Warren M .Cheek, Jr.
Registration No. 33,367
Attorney for Applicants

WMC/dlk
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
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